

**Documents**

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1 - an/1977-56430 - 0  
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2 - jp52076339/pn - 1  
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**1/1 DWPI - Derwent World Patents Index**

(C) Thomson Derwent

**Title** *Wax coating films prodn. of good adhesion - from compsn. obtd. by adding polyvalent metal cpd. to aq. emulsion of*

**Patent Data**

Patent Family *JP52076339 A 19770627 DW1977-32 \**  
Priority n° *1975JP-0151892 19751222*  
Covered countries *1*  
Publications count *1*

*AV*

**Abstract**

**Basic Abstract**

*JP52076339 A Method comprises adding a polyvalent metal cpd., capable of forming an aqs. soln. in ammonia or in amine-alkaline conditions, to an aq. emulsion with or without a surface active agent of a polyolefin or montan wax of acid value >20, or an aq. emulsion with or without a surface active agent of waxes like paraffin wax with a polyolefin wax or montan wax of acid value >20 or an alkaline water-soluble copolymer from maleic acid and other unsatd. polymerisable monomers, being used as emulsifying agent. Polyvalent metal cpd. is pref. ammonium zirconyl carbonate.*

*The wax coating films show improved water resistance and adhesion and are used in metal surface treatment, wood working, textile treatment and paper treatment as well as anti-fouling and corrosion protective paints.*

*In an example, an emulsion of 130 degrees F paraffin wax, montan wax of acid value 80 and triethanolamine is added with ammonium zirconyl carbonate at a rate of 2%, and is applied to a glass plate. The resulting coating had improved water resistance after 7-days immersion in water.*

**Patentee, Inventor**

Patent assignee *(SAID-) SAIDEN CHEMICAL KK*  
IPC *C09D-003/38 C09D-005/02 C09D-007/12*

**Accession Codes**

Number *1977-56430Y [32]*

**Codes**

Manual Codes *CPI: A03-C A04-G01E A08-M01C A08-S05 A10-E01 A12-B01A E32-A E35-L G02-A05*  
Derwent Classes *A82 E32 G02*  
Updates Codes  
Basic update code *1977-32*

*3 - jp08187818/pn - 1*

Doc. on ss 3 using max

**1/1 DWPI - Derwent World Patents Index**

(C) Thomson Derwent

**Title** *Corrosion-resistant coated aluminium plate prodn. - comprises coating plate with anodic oxide film and coating fil.*

**Patent Data**

Patent Family *JP08187818 A 19960723 DW1996-39 B32B-015/08 8p \* AP: 1995JP-0003875 19950113*  
Priority n° *1995JP-0003875 19950113*  
Covered countries *1*  
Publications count *1*

*AT*

**Abstract**

**Basic Abstract**

*JP08187818 A Al plate is obtd. by coating an Al plate with an anodic oxide film and coating the film with an organic resin film obtd. by dispersing a lubricant composed of at least one of polyolefin wax fine grains, polyethylene wax fine grains and fluororesin fine grains in polyurethane resin or epoxy resin.*

*USE - Used in electrical equipment, mechanical parts or building materials. (Dwg.0/0)*

**Patentee, Inventor**

Patent assignee *(NIMI) NIPPON LIGHT METAL CO*  
IPC *B32B-015/08 B32B-027/18 B32B-027/38 B32B-027/40 C23C-022/00*

**Accession Codes**

Number *1996-387910 [39]*  
Sec. No. *C1996-122184*  
Sec. No. *NI996-326803*

**Codes**

Manual Codes *CPI: A04-E10 A04-G01E A04-G02E A05-A01E4 A05-G01E1 A08-M03B A12-B04 M13-H05*  
Derwent Classes *A82 M13 P73*  
Updates Codes

Basic update code 1996-39

4 - jp61074678/pn - 1  
Doc. on ss 4 using max

1/1 DWPI - Derwent World Patents Index

(C) Thomson Derwent

Title Surface protection using separable polymer coating - includes first applying composite contg. aq. wax emulsion

Patent Data

Patent Family JP61074678 A 19860416 DW1986-22 7p \* AP: 1984JP-0197324 19840920  
Priority n° 1984JP-0197324 19840920  
Covered countries 1  
Publications count 1

AV

Abstract

Basic Abstract

JP61074678 A Compsn. contg. as a main ingredient aq. emulsions of wax (e.g. carnauba, microcrystalline or polyethylene wax) is coated on the surface of a body, and compsn. contg. as a main ingredient water-soluble polymers or aq. emulsion of polymer (e.g. copolymers of acrylate, styrene or vinylacetate) is applied to form a surface protective coating. Polymers are sepd. from the surface as polymer film, when the protective coating is no longer necessary.

USE/ADVANTAGE - Used to protect the surfaces of floor, wall, furniture, automobile bodies, etc. from stains or mechanical damage. Applicable to any surface, e.g. of metals, wood, glass, plastics, concrete, asphalt or stone. Polymer film can be sepd. at any time. Compsns. have low toxicity. (7pp Dwg.No.0/0)

Patentee, Inventor

Patent assignee (SAOG) SANSUI DENKI KK

IPC B05D-005/00

Accession Codes

Number 1986-140132 [22]  
Sec. No. C1986-059871  
Sec. No. N1986-103505

Codes

Manual Codes CPI: A08-M03B A12-B01 G02-A05D

Derwent Classes A14 A82 G02 P42

Updates Codes

Basic update code 1986-22

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## \* NOTICES \*

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1. This document has been translated by computer. So the translation may not reflect the original precisely.

2. \*\*\*\* shows the word which can not be translated.

3. In the drawings, any words are not translated.

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CLAIMS  
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[Claim(s)]

[Claim 1] It is the aluminum plate which an anodic oxide film is formed in the front face of aluminum material, and

the organic resin coat is formed on the anodic oxide film, and was excellent in the press-forming nature and

corrosion resistance to which it is characterized by said organic resin coat being the configuration which the

lubricant which consists of at least one of a polyolefine system wax impalpable powder particle, a polyethylene

system wax impalpable powder particle, and fluororesin system impalpable powder particles distributed to

polyurethane system resin or epoxy system resin.

[Claim 2] It is the aluminum plate excellent in the press-forming nature and corrosion resistance which are

characterized by the thickness of said anodic oxide film being 0.2-3 micrometers in an aluminum plate according to

claim 1.

[Claim 3] Said lubricant is the aluminum plate excellent in the press-forming nature and corrosion resistance which

are characterized by for particle diameter being 0.01-0.5 micrometers in an aluminum plate according to claim 1, and

variance being 1 - 50wt%.

[Claim 4] It is the aluminum plate excellent in the press-forming nature and corrosion resistance which are

characterized by the thickness of said organic resin coat being 0.3-3 micrometers in an aluminum plate according to

claim 1.

[Claim 5] It is the aluminum plate excellent in the press-forming nature and corrosion resistance which are

characterized by for the thickness of 0.2-3 micrometers and said organic resin coat of the thickness of said anodic

oxide film being 0.3-3 micrometers, and for the particle diameter of said lubricant being 0.01-0.5 micrometers

further in an aluminum plate according to claim 1, and variance being 1 - 50wt%.

DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the aluminum plate which was applied to the aluminum plate used

for household electric appliances, a machine part, building materials, household articles, etc., could fabricate

even if it did not use a press oil especially at the time of press forming, and was excellent in corrosion

resistance.

[0002]

[Description of the Prior Art] Aluminum is light, and since it is easy to carry out fabrication, it is widely used

for boxes, such as household electric appliances, a machine part, building materials, and household articles, a

container, components, etc. Although there is aluminum, in order that it may raise corrosion resistance further with

the ground as for corrosion resistance, it is used carrying out anodizing.

[0003] In case the aluminum plate which formed the anodic oxide film beforehand processes press forming etc., an

aluminum plate is locally burned on metal mold as the lubrication of the dice of a press and an aluminum plate is

inadequate, a crack occurs to a plate, and it has the fault to which it cannot fabricate in the purpose

configuration or a blemish is attached on the surface of a plate. Then, generally applying and carrying out press

working of sheet metal of the oily fluid lubrication agent to an aluminum plate front face at the time of press

forming for improvement in a moldability is further performed for generating prevention of such a crack and a

blemish.

[0004] However, if an oily fluid lubrication agent is used at the time of press forming, there is fear of the work

environment fall to lubricant, and it is necessary to use organic solvents, such as a trichloroethylene, and to

decrease the oily lubricant after press forming, further. In order that organic solvents, such as a

trichloroethylene, may destroy an ozone layer, although the use tends to be forbidden and drops off using oily

lubricant, a good aluminum plate for press forming of press-forming nature is desired in recent years.

[0005] what formed the anodic oxide film as the first pass on the surface of the aluminum plate, and formed in the

top face the lubricative inorganic compound which consists of water way acid chloride of alkali metal as the second

layer as such an aluminum plate for shaping (JP,5-306474,A) -- moreover, what formed the clo mate layer as the first

pass on the surface of the aluminum plate, and formed in the top face the second layer which consists of organic

resin containing lubricant (JP,5-311454,A) is proposed.

[0006]

[Problem(s) to be Solved by the Invention] However, the second layer of lubricity is not [ the former aluminum plate

] enough among the conventional techniques by which the proposal was made [ above-mentioned ] because of an

inorganic compound. On the other hand, since the first pass is a chromate film, the latter aluminum plate does not

have enough corrosion resistance compared with an anodic oxide film.

[0007] If continuation press forming of the aluminum plate is carried out, it will become a 100-130-degree C

elevated temperature, aluminum will become easy to adhere locally, and surface discontinuity, such as a blemish, and

printing will generate a die temperature on a plate front face. For this reason, an aluminum plate needs to have the

good lubricity which such adhesion does not produce. Moreover, it is called for that the aluminum plate after press

forming has good corrosion resistance.

[0008] In case press forming of the purpose of this invention is carried out without using oily lubricant, it is

offering the aluminum plate which there is no generating of printing or surface discontinuity even if a die

temperature's becomes an elevated temperature, and has corrosion resistance.

[0009]

[Means for Solving the Problem] The result variously studied about the aluminum plate which has many above-mentioned

properties even if artificers do not use oily lubricant, When an anodic oxide film thin as the first pass is formed

in an aluminum plate front face and an organic resin coat is further formed as the second layer on the surface of an

anodic oxide film, When a specific ingredient is used for the organic resin coat, the anodic oxide film of the first

pass It comes to suppress generating of the blemish on the front face of a plate in press forming, and even if a die

temperature becomes an elevated temperature, the organic resin coat of the second layer completes a header and this

invention for having sufficient lubricity, at the same time it gives good corrosion resistance to an aluminum plate.

[0010] That is, an anodic oxide film is formed in the front face of aluminum material, as for the aluminum plate of

this invention, the organic resin coat is formed on the anodic oxide film, and said organic resin coat is

characterized by the lubricant which consists of at least one of a polyolefine system wax impalpable powder

particle, a polyethylene system wax impalpable powder particle, and fluororesin system impalpable powder particles

being the configuration distributed to polyurethane system resin or epoxy system resin.

[0011] And it is good to set the thickness of said anodic oxide film as 0.2-3 micrometers, and to set the thickness

of said organic resin coat as 0.3-3 micrometers. Moreover, said lubricant is good to set up particle diameter as

0.01-0.5 micrometers, and to set up variance to 1 - 50wt%.

[0012]

[Function] While being able to give the corrosion resistance which was excellent by forming an anodic oxide film

thin as the first pass on the surface of an aluminum plate, it deforms without producing a big crack also in the

deformation at the time of press forming, and blemish generating can be prevented. Moreover, sufficient lubricity

can be given by forming an organic resin coat as the second layer. That is, since the lubricant which consists of at

least one of a polyolefine system wax impalpable powder particle, the poly CHIERN system wax impalpable powder

particle, and fluororesin system impalpable powder particles is the configuration which polyurethane system resin or

epoxy system resin was made to distribute, an organic resin coat can make a dynamic friction coefficient small, and

can give sufficient lubrication action. Consequently, it can prevent being burned on hot metal mold at the time of

press forming.

[0013] Especially an aluminum plate is not limited and can be chosen by the application. For example, the

aluminum-Mn system alloy which contains industrial use pure aluminium, 0.5 - 1.5% of Mn, and 0.5 - 2.0% of Mg to

building materials is [ the aluminium alloy with which the aluminium alloy which contains Mg 2 to 6% contains

industrial pure aluminium and Mg 0.5 to 3% in the member for household electric appliances ] still better in the

case of the member which can search for reinforcement and corrosion resistance like autoparts to use the aluminum-Mg

system alloy which contains industrial use pure aluminium and Mg 0.3 to 1.5% in household articles.

[0014] In the electrolytic solutions, such as a sulfuric acid, oxalic acid, and a chromic acid, an anodic oxide film

impresses an alternating current, a direct current, or the current of AC/DC superposition, and gives effectiveness

to prevention of the surface crack of the aluminum plate at the time of the corrosion resistance which was made to

form the oxide film of aluminum in an aluminum front face continuously, and was [ being the batch type or ]

excellent in the coiled form in the state of the end plate, and press forming. [0015] The thickness of an anodic oxide film is 0.2-3 micrometers, corrosion resistance sufficient in less than 0.2

micrometers is not acquired, but if it exceeds 3 micrometers, although corrosion resistance increases, a crack will

become easy to produce it at the time of press forming.

[0016] It will be as follows if the desirable conditions of an example of anodizing are shown. In the case of a

sulfuric acid, current density is performed by 1.0 - 20 A/dm<sup>2</sup> by the batch type in 0.5 - 3.0 A/dm<sup>2</sup> and continuation

Rhine using the 8-35-degree C electrolytic solution whenever [ 5 - 30% / of sulfuric-acid concentration / and

solution temperature ]. In the case of oxalic acid, current density is performed by 0.5 - 4.0 A/dm<sup>2</sup> by the batch

type using the 8-40-degree C electrolytic solution whenever [ 2 - 30% / of oxalic acid concentration /, and solution

temperature ]. On the other hand, in the case of a chromic acid, current density is performed by 0.8 - 8.0 A/dm<sup>2</sup> by

the batch type using the 8-35-degree C electrolytic solution whenever [ 3 - 30% / of chromic-acid concentration /,

and solution temperature ].

[0017] Even if organic resin touches metal mold hot by considering as polyurethane resin and an epoxy resin, it can

stop degradation. On the other hand, the lubricant distributed in an organic resin coat is used as polyolefine

system wax impalpable powder, polyethylene system wax impalpable powder, or fluorine system resin impalpable powder,

and even if it gives good lubricity at the time of press forming and a die temperature rises near 100 degree C

according to an operation of the lubricity which organic resin has, and dispersed impalpable powder-like lubricant

at the time of high-speed press forming, the effectiveness that printing does not arise in metal mold is

demonstrated. The effectiveness will be saturated, even if it is set as 0.3-3 micrometers, and lubrication

effectiveness sufficient in less than 0.3 micrometers is not acquired and the thickness of an organic resin coat

exceeds 3 micrometers.

[0018] Moreover, the particle diameter of lubricant is 0.05-0.5 micrometers, and the effectiveness will be saturated

with less than 0.05 micrometers, if it is difficult to distribute homogeneity industrially, and sufficient

lubrication action is not obtained and it exceeds 0.5 micrometers. The above-mentioned effectiveness discovers the

variance of lubricant as 1 - 50wt%. When lubrication effectiveness sufficient at less than 1% is not acquired and it

exceeds 50%, it is in the inclination for the effectiveness to be saturated. [0019] Spreading of the resin which distributed lubricant to homogeneity is applied to the predetermined thickness

of film by general approaches, such as roll coater spreading, a spray coating cloth, and dipping spreading, and can

be burned for 10 to 120 seconds by 100 to 300 degree C ambient temperature. As for the maximum temperature (PMT) of

the material at this time, it is desirable that it is the range of 80 to 250 degree C.

[0020]

[Example] Hereafter, the example of this invention is explained. The evaluation trial was performed by making into a

test coupon the aluminum plate which formed the anodic oxide film shown in Tables 2-5 using the aluminum plate of

0.5mm thickness which has the presentation shown in Table 1, and formed the lubrication coat shown in these tables

2-5.

[0021]

[Table 1]

[0022] The test coupon measured and evaluated each property by the approach shown below. The evaluation result is

shown in Table 6.

It pressed down with the metal mold which has the parallel field of two evaluation approach \*\* dynamic friction

coefficients of a test coupon, the sample was pressed down by force 2.0-4.0kN, and the force required in this

condition to draw out by 160 mm/min was searched for, and it asked for the dynamic friction coefficient mu by the

degree type.

[0023]  $\mu = P / 2F$  -- here, it is the P; drawing force F; presser-foot force. The judgment of a result considered as

fitness (0), when a dynamic friction coefficient mu was 0.10 or less, and when 0.10 was exceeded, it was taken as

the defect (x).

[0024] \*\* It asked for the greatest contraction ratio which can fabricate a cupping test by blank holder force

100kgf, without fracturing by carrying out using 33mm of diameters of marginal contraction-ratio punch, punch, and

metal mold with a shoulder radius [ of a die ] of 3mm, and considered as the marginal contraction ratio. The

judgment of a result considered as fitness (O), when a marginal contraction ratio was 2.05 or more, and in the case

of 2.04-2.00, it was made a little into the defect (\*\*), and the case of less than 2.00 was made into the defect

(x).

[0025] \*\* When press forming of the evaluation of the seizure nature to the metal mold at the time of printing-proof

nature draw forming was continuously carried out 10 times at 130 degrees C in consideration of the rise of the die

temperature in continuation press forming, the existence of generating of local printing to metal mold estimated it.

The judgment of a result considered as fitness (O), when printing did not occur, when it generated a little, it

considered as the defect (\*\*) a little, and when printing occurred, it was taken as the defect (x).

[0026] \*\* Visual observation of the front face of a resistance press-forming article with a plate surface crack was

carried out, and it judged a hard one with a surface crack. The judgment of a result considered as fitness (O), when

there was nothing with a blemish, and a little, in a certain case, it considered as the defect (\*\*) a little, and

when it was with a blemish, it was made into the defect (x).

[0027] \*\* The salt spray test of 1000 hours was carried out for the sample which put in the corrosion-resistant

cross cut. Evaluation judged the existence of generating of a filiform corrosion product by visual observation. The

judgment of a result considered as fitness (O), when there was no filiform corrosion product, when a less than 5mm

filiform corrosion product occurred, it considered as the defect (\*\*) a little, and when a filiform corrosion

product 5mm or more occurred, it was taken as the defect (x).

[0028]

[Table 2]

[0029]

[Table 3]

[0030]

[Table 4]

[0031]

[Table 5]

[0032]

## [Table 6]

[0033] The result shown in Table 6 shows that it can consider as a product by press working of sheet metal also

without an oily fluid lubrication agent with lubricity and corrosion resistance good [ the aluminum plate

(test-coupon notation: A, B, C, D, E, F) concerning this invention ].  
[0034] On the other hand, which property of the aluminum plate (test-coupon notation: G, H, I, J, K, L, M) which

separates from the conditions of this invention is not enough, and it turns out that it is difficult to consider as

a product by press working of sheet metal. That is, since the thickness of the organic resin used for the second

layer has separated from the configuration of this invention thinly, the test-coupon notation G has a high dynamic

friction coefficient, its marginal contraction ratio is a little low, its printing-proof nature is a little poor,

and it is inferior to the lubricity at the time of press forming in it. Since the magnitude of the lubricant

distributed in the organic resin of the second layer has separated from the configuration of this invention greatly,

the test-coupon notation H has a high dynamic friction coefficient, its marginal contraction ratio is low, its

printing-proof nature is a little poor, and it is inferior to the lubricity at the time of press forming in it.

Since the class of organic resin used for the second layer has separated from the test-coupon notations I and J from

the configuration of this invention, its dynamic friction coefficient is high, its marginal contraction ratio is

low, and its printing-proof nature is inadequate, and they are inferior to the lubricity at the time of press

forming.

[0035] Moreover, since the anodic oxide film of the first pass is not formed, the test-coupon notation K has the

poor resistance with a plate surface crack, and is inferior to the lubricity at the time of press forming in it.

Moreover, corrosion resistance is also poor. Since the class of coat prepared in the first pass has separated from

the test-coupon notation L from the configuration of this invention, its resistance with a plate surface crack is a

little poor, and it is inferior to the lubricity at the time of press forming in it. Moreover, corrosion resistance

is also poor. Since the thickness of the anodic oxide film prepared in the first pass has separated from the

test-coupon notation M from the configuration of this invention thickly, a marginal contraction ratio is low and

inferior to the lubricity at the time of press forming.

[0036]

[Effect of the Invention] Since the anodic oxide film was formed as the first pass on the surface of the aluminum

plate according to this invention as explained above, it gets damaged at the time of the corrosion resistance

improvement in an aluminum plate, and press forming, and prevention can be aimed at.

[0037] Moreover, an organic resin coat is formed as the 2nd layer on the surface of an anodic oxide film, and since

the lubricant which consists of at least one of a polyolefine system wax impalpable powder particle, a polyethylene

system wax impalpable powder particle, and fluororesin system impalpable powder particles considered the

configuration of the organic resin coat as the configuration distributed to polyurethane system resin or epoxy

system resin, sufficient lubrication action can be held also in the die temperature of 100 degrees C or more

produced at the time of continuation press forming. Consequently, while not using an oily fluid lubrication agent at

the time of press forming and being able to perform a press-forming activity in a clean environment at it, it is not

necessary to use organic solvents, such as trichloroethane, for removal of a fluid lubrication agent, and there is

outstanding effectiveness of contributing to protection of earth environment.

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[Translation done.]